




# GLAST Ground System Closed Risks

<u>Risk ID</u>	<u>Risk Name</u>	<u>Risk Status</u>	<u>Risk Planning Stage</u>
003	TDRSS Ku Scheduling	Open Closed Rejected	Research Accept Watch Mitigate
<u>Open Date</u>	<u>Originator</u>		
01/30/04	Jonathan DeGumbia		
<u>Risk Impact</u>	<u>Risk Probability</u>	<u>Risk Period</u>	<u>Risk Value</u>
Very High High Medium Low Verv Low	Very High High Medium Low Verv Low	Short (< 4 mo.) Mid (4-9 mo.) Long (> 9 mo.)	13  Low =  Med. =  High = 

## Risk Description

The TDRSS scheduling constraints, high instrument data rates, Ku-band antenna pointing limitations, complex observatory attitude profile, and non-centralized planning and scheduling parties combine to create a unique and complex scheduling environment. The inability to correctly schedule TDRSS Ku-band contacts could result in a loss of science data.




## Risk Mitigation

- 04) Continue the ongoing dialogue between the MOC and SN scheduling to identify and resolve issues as the scheduling plan matures.
- 05) Initiate a monthly working group between MOC and GSSC to promote communications and synergy between the groups.
- 06) Identify the complete set of use cases that will detail the ways that GLAST will perform science gathering so that scheduling tools and procedures can be designed to meet its needs.
- 07) Complete the evaluation of COTS software to determine the best fit for the GLAST scheduling needs at both the MOC and GSSC.

**Risk Mitigation Manager –**

## Risk Log

2/6/04 – Risk Accepted at GOWG.  
 4/26/04 – E-mail from J.D.: “This risk item was opened principally due to an incomplete understanding of the TDRSS scheduling environment and a void of such functionality in the heritage design. Since the opening of the risk item, all listed mitigation steps have been either initiated or completed. The primary benefit of these steps was to jump start communication between the various interested parties to collectively towards a solution. This resulted in the development of a conceptual design for the entire scheduling path that includes file formats, communication timing, and MOC software. These actions have reduced the risk to the point where TDRSS scheduling no longer constitutes a prominent concern. The normal design process will continue to develop the scheduling system to maturity along with the rest of the MOC systems.”  
 10/7/04 – Risk closed at GOWG per 4/26/04 information.

<u>Risk ID</u>	<u>Risk Name</u>	<u>Risk Status</u>	<u>Risk Planning Stage</u>
004	FY04 GS Budget Cut	Open Closed Rejected	Research Accept Watch Mitigate
<u>Open Date</u>	<u>Originator</u>		
01/30/04	Mike Rackley		
<u>Risk Impact</u>	<u>Risk Probability</u>	<u>Risk Period</u>	<u>Risk Value</u>
Very High High Medium Low Verv Low	Very High High Medium Low Verv Low	Short (< 4 mo.) Mid (4-9 mo.) Long (> 9 mo.)	8  Low =  Med. =  High = 

### Risk Description

In order to meet the budget requirements associated with the Confirmation Review process, the Project had to make an arbitrary cut in the ground system and flight operations FY04 budget (WBS7). This was driven by a general requirement to reduce FY04 costs to account for the 5-month launch slip from Sept'06 to Feb'07. But though the launch date has slipped, the ground system is working to pretty much the same schedule, choosing instead to use the launch slip as an opportunity to buy more schedule float and increase the amount of time that a stable and completed ground system would available for pre-launch operations activities.




### Risk Mitigation

- 1) Assess the actual cost savings expected for FY04 given the current schedule and plans. Include evaluation of the GSSC budget. This would be the expected costs compared to the budget approved in the last FY03 POP cycle. Define a complete set of requirements for the PSS, CTS (including LAT and GBM simulators), and MTS (including LAT and GBM simulators).
- 2) Determine what other cost deltas (uppers) exist if any for FY04 (e.g., associated with GFEP).
- 3) Put together a package summarizing the findings and present to the Project. Decide that the savings are adequate, or make the needed changes to the ground system schedule/plans and any associated contacts (e.g., MOC).

**Risk Mitigation Manager – Ken Lehtonen**

### Risk Log

2/6/04 – Risk Accepted at GOWG.  
 3/31/04 – Ground System POP budget was submitted to the Project on 3/26. Awaiting direction from the Project on FY04 costs and FY05 budget projections.  
 6/14/04 - No adjustments to the ground system budget have been received from the GPO. All FY04 activities are fully funded at POP 04 levels. No package summarizing our findings is required at this time. Recommend reduction of Risk Impact to Medium. Will keep open as the GLAST budget is fluid enough to warrant. Also, recommend changing Risk Planning Stage to "Watch" if that seems right given my update above?  
 10/7/04 – Risk closed at GOWG per 6/14/04 information.

<u>Risk ID</u>	<u>Risk Name</u>	<u>Risk Status</u>	<u>Risk Planning Stage</u>
005	GS Schedule Impacts	Open Closed Rejected	Research Accept Watch Mitigate
<u>Open Date</u>	<u>Originator</u>		
01/30/04	Mike Rackley		
<u>Risk Impact</u>	<u>Risk Probability</u>	<u>Risk Period</u>	<u>Risk Value</u>
Very High High Medium Low Verv Low	Very High High Medium Low Verv Low	Short (< 4 mo.) Mid (4-9 mo.) Long (> 9 mo.)	13  Low =  Med. =  High = 

#### Risk Description

The spacecraft and instrument schedules have slipped to the right for various reasons by between 3 and 5 months, depending on the milestone. But the ground system schedule has not slipped a comparable amount, since the desire is to build more float into the schedule and increase the amount of time that a completed and stable ground system is available for pre-launch operations activities. The ground system development and operations efforts are dependent in part on receiving information and documents from the spacecraft contractor and instrument teams, but the schedule for these is delayed given the changes in the spacecraft and instrument schedules. This could pose a risk that the ground system and operations schedules are too early relative to the other schedules, and that the ground system and operations teams build and plan to the wrong observatory design and/or interface.

#### Risk Mitigation

- 1) Obtain an accurate understanding of when reliable and detailed-enough information needed by the ground and operations teams will be made available by the spacecraft and instrument teams.
- 2) Analyze the current ground system and operations schedule given this information and determine if any changes are needed.

**Risk Mitigation Manager – Ken Lehtonen**




#### Risk Log

2/6/04 – Risk Accepted at GOWG.  
 3/15/04 – Discussed a schedule slip of the GS SDR to early October with the PM and was asked to move the GS SDR to August prior to the project's MCDR scheduled for early September, 2004. Other scheduling changes will be made based upon the results of the GLAST Spacecraft CDR, detailed design peer reviews, and the Ground System SDR.  
 6/14/04 - Recommend Closure. Overall Ground System schedule has been solid for several months now and a firm review schedule in place. No major adjustments to the schedule are required.  
 10/7/04 – Risk closed at GOWG per 6/14/04 information.

<u>Risk ID</u>	<u>Risk Name</u>	<u>Risk Status</u>	<u>Risk Planning Stage</u>
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<b>006</b>	MOC to SLAC data transfer	Open <b>Closed</b> Rejected	Research <b>Accept</b> Watch Mitigate
<u>Open Date</u>	<u>Originator</u>		
2/4/04	Howard Dew		

<u>Risk Impact</u>	<u>Risk Probability</u>	<u>Risk Period</u>	<u>Risk Value</u>
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Very High <b>High</b> Medium Low Very Low	Very High High Medium <b>Low</b> Very Low	Short (< 4 mo.) <b>Mid (4-9 mo.)</b> Long (> 9 mo.)	<b>12</b> Low =  Med. =  High = 
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### Risk Description

The network connection between GSFC and the SLAC must be reliable enough to support science file transfers at 4.3 M bits/sec from the GLAST MOC to the SLAC. If reliability and throughput is not maintained, there is a risk that the LAT ISOC will not receive their science data within the required science data transfer latency of 72 hours from Observatory detection to LAT ISOC capture.

### Risk Mitigation

The best way to mitigate this risk is to purchase a 4.3 MBPS dedicated link between the GLAST MOC and the SLAC with Mission Critical reliability. This is extremely expensive. The less costly way to mitigate this risk is to utilize an existing Standard IP reliability network link already connecting Maryland University to Stanford University. This link is part of the Abilene Network (INTERNET-2) which currently hosts Earth Observing System data traffic. If the GLAST MOC can be connected to the Abilene Network, the 4.3 Mbps bandwidth requirement and network reliability should not be an issue.

**Risk Mitigation Manager – Howard Dew**

### Risk Log

2/6/04 – Risk Accepted at GOWG.  
 4/13/04 – A workstation (glyph) has been purchased by the GSSC and is currently being set up for testing data bandwidths between the HEASARC/GSSC and the SLAC. The tests involve connecting to the workstation inside the HEASARC and then running cron jobs on it for bandwidth measurements of data throughput. The workstation has been configured and coordination for account setup is being worked by SLAC and GSSC personnel. The CNE firewall currently has a GSFC Center-shared throughput rate of 200 Mbits/sec to and from the INTERNET. *HCD*  
 6/9/04 – Howard Dew recommends closure.  
 10/7/04 – Risk closed at GOWG per Howard Dew's recommendation.

<u>Risk ID</u>	<u>Risk Name</u>	<u>Risk Status</u>	<u>Risk Planning Stage</u>
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007

GLAST MOC Procurement

Open  
Closed  
Rejected

Research  
Accept  
Watch  
Mitigate

<u>Open Date</u>	<u>Originator</u>
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1/30/04

Dennis Small




<u>Risk Impact</u>	<u>Risk Probability</u>	<u>Risk Period</u>	<u>Risk Value</u>
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Very High  
High  
Medium  
Low  
Verv Low

Very High  
High  
Medium  
Low  
Verv Low

Short (< 4 mo.)  
Mid (4-9 mo.)  
Long (> 9 mo.)

13

Low =   
Med. =   
High = 

Risk Description

If the GLAST MOC procurement doesn't occur by May 1, 2004 current proposed Ground System schedules and projected MOC costs will be impacted.

Risk Mitigation

- 1) GLAST Project will be meeting with Goldbelt Orca on 2/6/04 to walkthrough the GLAST MOC and Operations Support SOW and Contract. The meeting with Goldbelt Orca at this time would cut down on time required to evaluate and respond to the proposal. (2/5/04)
- 2) Identify proposal evaluation team so that all are knowledgeable of the content of the RFP so no time is wasted when proposal is received from Goldbelt Orca.
- 3) Develop evaluation schedule.

**Risk Mitigation Manager – Dennis Small**

Risk Log

2/6/04 – Risk Accepted at GOWG.

3/31/04– MOC RFP was delivered to Goldbelt Orca March 30, 2004.

MOC Proposal Evaluation Team members are Dennis Small, Ken Lehtonen, John Donohue, Mike Rackley, Mark Sedilick and Neil Square.

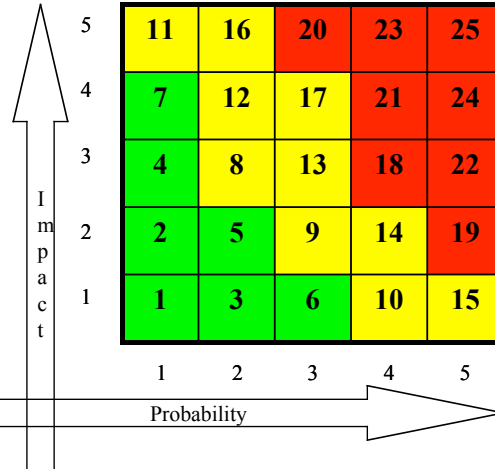
Schedule development is in progress.

10/7/04 Risk closed at GOWG. Per Dennis Small, contract Award to Goldbelt Orca on September 24, 2004.

### LEGEND

- High – Implement new process(es) or change baseline plan(s)
- Med – Aggressively manage; consider alternative process
- Low - Monitor

What is the probability of the situation or circumstances happening?		
Level	Probability	The current process
5	Very High	Near Certainty
4	High	Highly Likely
3	Moderate	May prevent this event, but additional actions will be required
2	Low	Is usually sufficient to prevent this type of event
1	Very Low	Is likely sufficient to prevent this event



Given the event occurs, what is the magnitude of the impact to the mission?					
Level	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)
Technical	Minimal or no Impact	Moderate reduction, same approach retained	Moderate reduction, workarounds required	Major Reduction, workarounds required	Must be Mitigated
Schedule	Minimal Impact	Additional activities required in order to meet need date	Level 2 Milestone slip of up to <= 1 month	Level 2 Milestone slip of > 1 month, or critical path impacted	Cannot achieve major program milestone
Cost	Minimal Impact of <\$25k	Budget increase between \$25k and \$100k	Budget increase between \$100k and \$250k	Budget increase between \$250k and \$1M	Budget increase greater than \$1M